REMARKS

An Excess Claim Fee Payment Letter is submitted herewith to cover the cost of three (3) excess total claims.

Claims 1-14, 24-31, 33-34, 36-37 and 39-46 are all the claims presently pending in the application. Claims 1, 6, 10-11 and 24-25 have been amended to more particularly define the invention. Claims 40-46 have been added to claim additional features of the invention.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicant specifically states that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 24-25 stand rejected under 35 U.S.C. § 102(a) as being anticipated by Chon, et al. ("FATIGUE FREE SAMARIUM-MODIFIED BISMUTH TITANATE FILM CAPACITORS HAVING A LARGE SPONTANEOUS POLARIZATIONS"). Claims 1-14 and 28-30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Haukka, et al. (U.S. Pregrant Publication No. 2002/01 15252). Claims 31, 33-34, 36-37 and 39 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Haukka, et al. and Chon, et al.

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

The claimed invention is directed to a data storage element which includes a substrate including a semiconductor material, a metal oxide layer including an electrically insulating rare earth metal oxide disposed upon a surface of the substrate, and forming an active element of the data storage element, a conductive material disposed upon the metal oxide layer, a first electrode electrically connected to the conductive material, and a second electrode connected to the substrate, to form the data storage element. Importantly, the metal oxide layer has a thickness in a range from 50Å to 500Å.

Conventional data storage elements use metal films for accumulating charge (e.g., as an

active element). However, such devices have high charging voltage requirements and the charge retention times are short (Application at page 1, line 10-page 2, line 5).

The claimed invention, on the other hand, includes a metal oxide layer including an electrically insulating rare earth metal oxide disposed upon a surface of the substrate, and forming an active element of the data storage element. Importantly, the metal oxide layer has a thickness in a range from 50Å to 500Å (Application at page 5, lines 5-11; Figures 4-5). This allows the metal oxide layer to act as an active element of the data storage element (**Application at page 7, lines 1-11**).

II. THE PRIOR ART REFERENCES

A. The Chon, et al. Reference

The Examiner alleges that Chon teaches the claimed invention of claims 24-25. Applicant submits, however, that there are elements of the claimed invention which are neither taught nor suggested by Chon.

Chon discloses a $Bi_{3.15}Sm_{0.85}Ti_3O_{12}$ (BSmT) thin film grown on $Pt/TiO_2/SiO_2/Si(100)$ substrates using the method of metalorganic sol decomposition. In addition, Chon discloses a BsmT capacitor allegedly showing good charge–retention characteristics (Chon at Abstract).

However, Chon does not teach or suggest "*a metal oxide layer comprising an electrically insulating rare earth metal oxide disposed upon a surface of said substrate, said metal oxide layer having a thickness in a range from 50Å to 500Å and forming an active element of said data storage element*", as recited, for example, in claim 1.

As noted above, unlike conventional data storage elements use metal films for accumulating charge (e.g., as an active element) and, thus, have high charging voltage requirements and the charge retention times are short, the claimed invention includes a metal oxide layer including an electrically insulating rare earth metal oxide disposed upon a surface of the substrate, and forming an active element of the data storage element.

Importantly, the metal oxide layer has a thickness in a range from 50Å to 500Å. (Application at page 5, lines 5-11; Figures 4-5). This allows the metal oxide layer to act as an

active element of the data storage element (**Application at page 7, lines 1-11**).

Clearly, these novel features are not taught or suggested by Chon. Indeed, the Examiner has not even alleged that Chon taught or suggested this feature.

In fact, Chon merely discloses a BSmT film which forms a dielectric layer in a capacitor (e.g., see Chon at Figure 2). Indeed, nowhere does Chon even teach or suggest a metal oxide layer, let alone the metal oxide layer of the claimed invention which has a thickness in a range from 50Å to 500Å.

Moreover, Applicant points out that nowhere does Chon teach or suggest using a metal oxide layer as an active element of a data storage element. Thus, Applicant respectfully submits that Chon is completely unrelated to the claimed invention.

Therefore, Applicant submits that there are elements of the claimed invention that are not taught or suggest by Chon. Therefore, the Examiner is respectfully requested to withdraw this rejection.

B. The Haukka, et al. Reference

The Examiner alleges that Haukka makes obvious the invention of claims 1-13 and 28-30. In addition, the Examiner alleges that Haukka would have been combined with Chon to form the claimed invention of claims 31, 33-34, 36-37 and 39. Applicant submits, however, that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention.

Haukka discloses **very thin** aluminum oxide and lanthanide layers, particularly formed by an atomic layer deposition (ALD) type process, which serve as interface layers between two or more materials. The interface layers are intended solely to prevent oxidation of a substrate and prevent diffusion of molecules between the materials (Haukka at Abstract).

However, Applicant submits that these references would not have been combined as alleged by the Examiner. Indeed, these references are directed to different problems and solutions.

Specifically, Chon is directed to BSmT film for a capacitor, whereas Haukka is merely

directed to dielectric interface (e.g., aluminum oxide) films. Therefore, these references are completely unrelated, and no person of ordinary skill in the art would have considered combining these disparate references, absent impermissible hindsight.

Further, Applicant submits that the Examiner can point to no motivation or suggestion in the references to urge the combination as alleged by the Examiner. Indeed, contrary to the Examiner's allegations, neither of these references teach or suggest their combination. Therefore, Applicant respectfully submits that one of ordinary skill in the art would not have been so motivated to combine the references as alleged by the Examiner. Therefore, the Examiner has failed to make a prima facie case of obviousness.

However, neither Haukka, nor Chon nor any combination thereof teaches or suggests "*a metal oxide layer comprising an electrically insulating rare earth metal oxide disposed upon a surface of said substrate, said metal oxide layer having a thickness in a range from 50Å to 500Å and forming an active element of said data storage element*", as recited, for example, in claim 1.

As noted above, unlike conventional data storage elements use metal films for accumulating charge (e.g., as an active element) and, thus, have high charging voltage requirements and the charge retention times are short, the claimed invention includes a metal oxide layer including an electrically insulating rare earth metal oxide disposed upon a surface of the substrate, and forming an active element of the data storage element.

Importantly, the metal oxide layer has a thickness in a range from 50Å to 500Å. (Application at page 5, lines 5-11; Figures 4-5). This allows the metal oxide layer to act as an active element of the data storage element (**Application at page 7, lines 1-11**).

Clearly, these novel features are not taught or suggested by Haukka. Indeed, the Examiner alleges that Haukka teaches a metal oxide layer like that of the claimed invention having a thickness of 30-90 Å. However, the Examiner does not indicate where this is disclosed in Haukka. This is clearly not the case.

Applicant would respectfully request that the Examiner specifically identify where the limitations of the claimed invention are taught or suggested in Haukka.

In fact, Applicant respectfully submits that nowhere does Haukka teach or suggest the

metal oxide layer of the claimed invention. Indeed, as noted above, Haukka merely teaches a very thin layer of AlO or LaO which is merely intended to act as a barrier layer, not as an active element of a memory element (e.g., "preferably between about 3 Åand 6 Å"(Haukka at [0027]; Figure 1). Indeed, Haukka would have no reason to form a layer thick enough to act as an active element of a memory element.

Applicant would also point out that neither is the claimed invention taught or suggested by Figure 4 in Haukka and the accompanying text. Indeed, in that embodiment, Haukka teaches layers of Al_2O_3 formed on a ZrO_2 layer, which is unrelated to the claimed invention.

Applicant would further point out that nowhere does Haukka teach or suggest a metal oxide layer which forms an active layer in a data storage element. Indeed, nowhere does Haukka teach or suggest a metal oxide the metal oxide layer has a thickness in a range from 50Å to 500Å.

As noted above, Chon does not teach or suggest these features. Therefore, Chon clearly does not make up for the deficiencies of Haukka.

Therefore, Applicant submits that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw this rejection.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1-14 and 24-31, 33-34, 36-37 and 39-46, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Assignee's Deposit Account No. 50-0510.

Respectfully Submitted,

Date: 6/24/04

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CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that the foregoing Amendment was filed by facsimile with the United States Patent and Trademark Office, Examiner Bradley Smith, Group Art Unit # 2824 at fax number (703) 872-9306 this 24 day of June, 2004.

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